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Dynamics of two dimensional alkylsiloxane self assembled monolayers[1] MARY SCOTT, DERRICK STEVENS, JASON BOCHINSKI, LAURA CLARKE, North Carolina State University Dept of Physics — Self assembled monolayers (SAMs) are commonly implemented as a method to easily and permanently modify surface properties. For many existing applications, SAMs are considered essentially static systems; however, motion within disordered SAMs is of interest to the thin film community, and such systems could be studied as simplified examples of glassy materials, where density is explicitly controllable and molecule-molecule interactions can be tuned. In this study, sensitive, temperature dependent dielectric spectroscopy has been used to study molecular motion within two dimensional alkylsiloxane SAMs. Highly disordered SAMs of varying density were grown, with the intention of maximizing the motion within the films. A cooperative relaxation is observed in films with an alkyl chain length greater than three carbons long. This interacting motion has similar dynamics to a previously reported polyethylene-like glass transition occurring in phase segregated alkyl side chains of polymers with various backbones. At high film densities, an additional, local relaxation occurs. This relaxation, which has been previously observed in three dimensional SAMs, is attributed to sub-chain rotation.

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